

Model Amendment to a Zoning Ordinance or By-law: Allowing Conditional Use of Wind Energy Facilities

Prepared by:

Massachusetts Department of Energy Resources
Massachusetts Executive Office of Environmental Affairs

May 2009

This Model By-Law was prepared to assist cities and towns in establishing reasonable standards for wind power development. The by-law is developed as a model and not intended for adoption without specific review by municipal counsel.

1.0 Purpose

The purpose of this by-law is to provide for the construction and operation of wind energy facilities and to provide standards for the placement, design, construction, monitoring, modification and removal of wind facilities that address public safety, minimize impacts on scenic, natural and historic resources of the city or town and provide adequate financial assurance for decommissioning.

The provisions set forth in this section shall take precedence over all other sections when considering applications related to the construction, operation, and/or repair of wind energy facilities.

1.1 Applicability

This section applies to all utility-scale, on-site wind facilities, and small wind energy systems, proposed to be constructed after the effective date of this section. This section also includes building integrated wind systems, and physical modifications to existing wind facilities that materially alter the type, configuration, or size of such facilities or other equipment.

This section does not apply to off-shore wind systems.

2.0 Definitions

Utility-Scale Wind Facility: A commercial wind facility, where the primary use of the facility is electrical generation to be sold to the wholesale electricity markets.

On-Site Wind Facility: A wind project, which is located at a commercial, industrial, agricultural, institutional, or public facility that will generate electricity on-site.

Height: The height of a wind turbine measured from natural grade to the tip of the rotor blade at its highest point, or blade-tip height.

Rated Nameplate Capacity: The maximum rated output of electric power production equipment. This output is typically specified by the manufacturer with a “nameplate” on the equipment.

Special Permit Granting Authority: The special permit granting authority shall be the board of selectmen, city council, board of appeals, planning board, or zoning administrator as designated by zoning ordinance or by-law for the issuance of special permits, or by this section for the issuance of special permits to construct and operate wind facilities.

Substantial Evidence: Such evidence as a reasonable mind might accept as adequate to support a conclusion.

Wind Energy Facility: All equipment, machinery and structures utilized in connection with the conversion of wind to electricity. This includes, but is not limited to, transmission, storage, collection and supply equipment, substations, transformers, service and access roads, and one or more wind turbines.

Wind Monitoring or Meteorological Tower: A temporary tower equipped with devices to measure wind speeds and direction, used to determine how much wind power a site can be expected to generate.

Wind turbine: A device that converts kinetic wind energy into rotational energy that drives an electrical generator. A wind turbine typically consists of a tower, nacelle body, and a rotor with two or more blades.

Building Inspector: The inspector of buildings, building commissioner, or local inspector, or, if there are none in a town, the board of selectmen, or person or board designated by local ordinance or by-law charged with the enforcement of the zoning ordinance.

Building Permit: A building permit is a required approval of a project by a licensed building inspector which is consistent with the local, state and federal building codes. In addition, the permit must meet the criteria set forth under the local zoning by-laws regarding small wind energy systems.

Special Use Permit: A permit provided by the special permit granting authority for non-conforming small wind energy systems (e.g. a small wind energy system that does not meet the criteria for small wind systems set forth by the Building Inspector).

Small Wind Energy System: All equipment, machinery and structures utilized in connection with the conversion of kinetic energy of wind into electrical power. This includes, but is not limited to, storage, electrical collection and supply equipment, transformers, service and access roads, and one or more wind turbines, which have a total rated nameplate capacity of not more than 100kW/ 0.1MW.

Large Wind Facility: equipment, machinery and structures utilized in connection with the conversion of kinetic energy of wind into electrical power with a rated output of electrical power production equipment of greater than 100kW/0.1MW.

Agriculture: ‘Farming’ or ‘agriculture’ shall include farming in all of its branches and the cultivation and tillage of the soil, dairying, the production, cultivation, growing and harvesting of any agricultural, aquacultural, floricultural or horticultural commodities, the growing and harvesting of forest products upon forest land, the raising of livestock including horses, the keeping of horses as a commercial enterprise, the keeping and raising of poultry, swine, cattle and other domesticated animals used for food purposes, bees, fur-bearing animals, and any forestry or lumbering operations, performed by a farmer, who is hereby defined as one engaged in agriculture or farming as herein defined, or on a farm as an incident to or in conjunction with such farming operations, including preparations for market, delivery to storage or to market or to carriers for transportation to market.

Building Integrated Wind Energy Facility: A wind energy facility shall be considered to be building integrated if it is designed to be permanently mounted on a building or other inhabitable structure. This definition applies to wind turbines of any capacity that are designed to be operated in direct contact with a building. This definition also covers, for the purposes of this zoning provision, other wind energy facilities primarily used for land-based applications which may be permanently mounted and operated on a building.

3.0 General Requirements for all Wind Energy Facilities

The following requirements are common to all wind energy facilities and must be followed in addition to the technology-specific requirements given in sections 4, 5, or 6.

3.1 Exemptions

Wind turbines constructed, reconstructed, or renovated for the primary purpose of commercial agriculture shall be considered a structure pursuant to MGL, c. 40A, §3 and, therefore, shall be exempt from this ordinance [by-law].

3.2 A permit shall be granted unless the permit granting authority finds in writing that there is substantial evidence that:

- (a) the specific site is not an appropriate location for such use;
- (b) there is expected to be any serious hazard to pedestrians or vehicles from the use;
- (d) a nuisance is expected to be created by the use; and
- (e) adequate and appropriate facilities will be not provided for the proper operation and maintenance of the use.

| Technology | Permit Needed |
|--|---------------------------|
| Small Wind -Meteorological towers | Building Inspector Permit |
| Large Wind -Utility scale, on-site wind use | Special Permit |
| Building Integrated Wind | Special Permit |

3.3 Compliance with Laws, Ordinances and Regulations

The construction and operation of all such proposed wind energy facilities shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable safety, construction, environmental, electrical, communications and aviation requirements.

3.4 Proof of Liability Insurance

The applicant shall be required to provide evidence of liability insurance in an amount, and for a duration, sufficient to cover loss or damage to persons and property occasioned by the failure of the facility.

3.5 Site Control

At the time of its application for a special or building permit, the applicant shall submit documentation of actual or prospective control of the project site sufficient to allow for installation and use of the proposed facility. Documentation shall also include proof of control over setback areas and access roads, if required. Control shall mean the legal authority to prevent the use or construction of any structure for human habitation within the setback areas.

3.6 Utility Notification

No wind energy facility shall be installed until evidence has been given that the utility company has been informed of the customer's intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

3.7 Temporary Meteorological Towers (Met Towers)

Met towers shall be permitted under the same standards as a small wind system, except that the requirements apply to a temporary structure. A permit for a temporary met tower shall be valid for a maximum of 3 years after which an extension may be granted. Small anemometers installed directly on buildings shall not require a building or special permit.

3.8 Design Standards

3.8.1 Appearance, Color and Finish

FAA safety consideration on color and appearance should be respected. Where applicant is seeking a non-standard color in an area not regulated by the FAA, the zoning board has authority to regulate color of turbine.

3.8.2 Lighting

Wind turbines shall be lighted only if required by the Federal Aviation Administration. Lighting of other parts of the wind energy facility, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties.

3.8.3 Signage

Signs on the wind energy facility shall comply with the requirements of the town's sign regulations, and shall be limited to:

- (a) Those necessary to identify the owner, provide a 24-hour emergency contact phone number, and warn of any danger.

- (b) Educational signs providing information about the facility and the benefits of renewable energy.

3.8.4 Advertising

Wind turbines shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the wind energy facility.

3.8.5 Utility Connections

Reasonable efforts shall be made to locate utility connections from the wind energy facility underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

3.8.6 Appurtenant Structures

All appurtenant structures to such wind energy facilities shall be subject to reasonable regulations concerning the bulk and height of structures and determining yard sizes, lot area, setbacks, open space, parking and building coverage requirements. All such appurtenant structures, including but not limited to, equipment shelters, storage facilities, transformers, and substations, shall be architecturally compatible with each other and shall be contained within the turbine tower whenever technically and economically feasible. Whenever reasonable, structures should be shaded from view by vegetation and/or located in an underground vault and joined or clustered to avoid adverse visual impacts.

3.9 Safety and Environmental Standards

3.9.1 Emergency Services

The applicant shall provide a copy of the project summary, electrical schematic, and site plan to the local emergency services entity, as designated by the permit granting authority. Upon request the applicant shall cooperate with local emergency services in developing an emergency response plan. All means of disconnecting the wind energy facility shall be clearly marked.

The applicant or facility owner shall maintain a phone number and identify a responsible person for the public to contact with inquiries and complaints throughout the life of the project.

3.9.2 Unauthorized Access

Wind turbines or other structures part of a wind energy facility shall be designed to prevent unauthorized access. For instance, the tower shall be designed and installed so as to not provide step bolts or other climbing means readily accessible to the public for a minimum height of 8 feet above the ground. Electrical equipment shall be locked where possible.

3.9.3 Shadow/Flicker

Wind energy facilities shall be sited in a manner that minimizes shadowing or flicker impacts. The applicant has the burden of proving that this effect does not have significant adverse impact on neighboring or adjacent uses.

Educational Note: Shadow flicker is caused by sunlight passing through the swept area of the wind turbine's blades. As sunlight passes through the spinning blades, it is possible to have a stroboscopic effect that can, under the right conditions, affect persons prone to epilepsy. In general, these conditions require varying light intensity at frequencies of 2.5-3 Hz. Large commercial turbines are typically limited to a frequency of less than 1.75 Hz. Furthermore, the impacts of shadow flicker diminish rapidly with distance and should be minimal at 10 or more rotor diameters. Though the RPM for smaller turbines is generally higher (up to 350 RPM, for some turbines), the small size of the rotor swept area, combined with the shorter tower heights, support a negligible shadow flicker impact from these types of facilities. In any case, the effects of shadow flicker are a seasonal and/or diurnal impact, requiring that the sun be at the right position in the sky to generate a line of sight with the affected building and the wind turbine rotor. As such, the impacts of shadow flicker will generally only be felt for a few hours per year.

3.9.4 Sound

The wind facility and associated equipment shall conform with the provisions of the Department of Environmental Protection's, Division of Air Quality Noise Regulations (310 CMR 7.10), unless the Department and the Permit Granting Authority agree that those provisions shall not be applicable. A source of sound will be considered to be violating these regulations if the source:

- (a) Increases the broadband sound level by more than 10 dB(A) above ambient, or
- (b) Produces a "pure tone" condition – when an octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.

These criteria are measured both at the property line and at the nearest inhabited structure. Ambient is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment hours. The ambient may also be established by other means with consent from DEP. An analysis prepared by a qualified engineer shall be presented to demonstrate compliance with these noise standards, if required by the permit granting authority.

The permit granting authority, in consultation with the Department, shall determine whether such violations shall be measured at the property line or at the nearest inhabited residence.

3.9.5 Land Clearing, Soil Erosion and Habitat Impacts

Clearing of natural vegetation shall be limited to that which is necessary for the construction, operation and maintenance of the wind facility and is otherwise prescribed by applicable laws, regulations, and ordinances.

3.10 Monitoring and Maintenance

3.10.1 Facility Conditions

The applicant shall maintain the wind energy facility in good condition. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief and Emergency Medical Services. The project owner shall be responsible for the cost of maintaining the wind energy facility and any access road(s), unless accepted as a public way, and the cost of repairing any damage occurring as a result of operation and construction.

3.10.2 Modifications

All material modifications to a wind energy facility made after issuance of the permit shall require approval by the permit granting authority as provided in this section.

3.11 Abandonment or Decommissioning

3.11.1 Removal Requirements

Any wind energy facility which has reached the end of its useful life or has been abandoned shall be removed. When the wind energy facility is scheduled to be decommissioned, the applicant shall notify the town by certified mail of the proposed date of discontinued operations and plans for removal. The owner/operator shall physically remove the wind facility no more than 150 days after the date of discontinued operations. At the time of removal, the wind facility site shall be restored to the state it was in before the facility was constructed or any other legally authorized use. More specifically, decommissioning shall consist of:

- (a) Physical removal of all wind turbines, structures, equipment, security barriers and transmission lines from the site.
- (b) Disposal of all solid and hazardous waste in accordance with local and state waste disposal regulations.
- (c) Stabilization or re-vegetation of the site as necessary to minimize erosion. The permit granting authority may allow the owner to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

3.11.2 Abandonment

Absent notice of a proposed date of decommissioning, the facility shall be considered abandoned when the facility fails to operate for more than one year without the written consent of the permit granting authority. The permit granting authority shall determine in its decision what proportion of the facility is inoperable for the facility to be considered abandoned. If the applicant fails to remove the wind energy facility in accordance with the requirements of this section within 150 days of abandonment or the proposed date of

decommissioning, the town shall have the authority to enter the property and physically remove the facility.

3.11.4 Expiration

A permit issued pursuant to this ordinance shall expire if:

- (a) The wind energy facility is not installed and functioning within 48-months from the date the permit is issued; or,
- (b) The wind energy facility is abandoned.

3.11.5 Violations

It is unlawful for any person to construct, install, or operate a wind energy system that is not in compliance with this ordinance or with any condition contained in a permit issued pursuant to this ordinance. Wind energy systems installed prior to the adoption of this ordinance are exempt.

4.0 Small Wind Energy Facility Requirements

4.1 Building Inspector Issued Permit

No small wind energy system shall be erected, constructed, installed or modified as provided in this section without first obtaining a building permit from a licensed building inspector. All such wind energy systems shall be constructed and operated in a manner that, where economically feasible, minimizes adverse visual, safety and environmental impacts. The construction of a small wind facility shall be permitted in any zoning district subject to the issuance of a Permit and provided that the use complies with all requirements set forth in sections 3 and 4.

4.2 Height

Small wind turbines shall be no higher than 250 feet above the current grade of the land, as measured at the uppermost point of the rotor's swept area. A small wind turbine may exceed 250 feet if:

- (a) the applicant demonstrates by substantial evidence that such height reflects industry standards for a similarly sited wind facility;
- (b) such excess height is necessary to prevent financial hardship to the applicant, and
- (c) the facility satisfies all other criteria for the granting of a building permit under the provisions of this section.

4.3 Setbacks

Small wind turbines shall be set back a distance equal to 1.5 time the overall blade tip height of the wind turbine time from the nearest existing residential or commercial structure and 50 feet from the nearest property line and private or public way.

4.4 Setback Waiver

The permit granting authority may reduce the minimum setback distance as appropriate, based on site-specific considerations, or written consent of the affected abutter(s), if the project satisfies all other criteria for the granting of a special permit under the provisions of this section.

4.5 Application Process & Requirements

A building permit shall be required for the installation of a small wind energy system.

4.5.1 General Required Documents

The building permit application shall be accompanied by deliverables including the following:

- (a) A plot plan showing:
 - i. Property lines and physical dimensions of the subject property within 2 times the total height of the wind turbine from the proposed tower location.
 - ii. Location, dimensions, and types of existing major structures on the property
 - iii. Location of the proposed wind system tower, foundations, guy anchors and associated equipment.
 - iv. The right-of-way of any public road that is contiguous with the property;
 - v. Any overhead utility lines
 - vi. Location and approximate height of tree cover;
- (b) Wind system specifications, including manufacturer and model, rotor diameter, tower height, tower type (freestanding or guyed)
- (c) One or three line electrical diagram detailing wind turbine, associated components, and electrical interconnection methods, with all NEC compliant disconnects and overcurrent devices.
- (d) Foundations for towers less than or equal to 160ft must have blueprints or drawings signed by a Professional Engineer.
- (e) Foundations for towers greater than 160ft must have blueprints or drawings signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts.
- (f) Name, address, phone number and signature of the applicant, as well as all co-applicants or property owners, if any.
- (g) The name, contact information and signature of any agents representing the applicant.
- (h) A plan for maintenance of the small wind energy facility.

4.6 Fees

The application for a building permit for a wind energy system must be accompanied by the fee required for a building permit for a Permitted Accessory Use.

5.0 Large Wind Energy Facility Requirements (Utility and On-Site Projects)

Special permits shall be granted by the Permit Granting Authority for large wind energy facilities that meet the criteria outlined in this section and in section 3 of this zoning provision.

5.1 Special Permit Granting Authority

No wind energy facility over 100 kilowatts of rated nameplate capacity shall be erected, constructed, installed or modified as provided in this section without first obtaining a permit from the special permit granting authority. The construction of a wind energy facility shall be permitted subject to the issuance of a Special Permit and provided that the use complies with all requirements set forth in sections 3 and 5. All such wind energy facilities shall, where economically feasible, be constructed and operated in a manner that minimizes adverse visual, safety, and environmental impacts.

5.2 Financial Surety

The permit granting authority may require the applicant for utility scale wind facilities to provide a form of surety, either through escrow account, bond or otherwise, to cover the cost of removal in the event the town must remove the facility, of an amount and form determined to be reasonable by the special permit granting authority, but in no event to exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the applicant. Such surety will not be required for municipally or state-owned facilities. The applicant shall submit a fully inclusive estimate of the costs associated with removal, prepared by a qualified engineer. The amount shall include a mechanism for Cost of Living Adjustment.

5.3 Height

Large wind energy facilities shall be no higher than 450 feet above the current grade of the land, provided that wind facilities may exceed 450 feet if:

- (a) the applicant demonstrates by substantial evidence that such height reflects industry standards or manufacturer recommendations for a similarly sited wind facility;
- (b) if applicant can demonstrate significant financial gain due to additional height, and
- (c) the facility satisfies all other criteria for the granting of a building permit under the provisions of this section.

5.4 Setbacks

Large wind turbines shall be set back a distance equal to 3 times the overall blade tip height of the wind turbine from the nearest existing residential or commercial structure and the overall blade tip height from the nearest property line and private or public way.

5.4.1 Setback Waiver

The special permit granting authority may reduce the minimum setback distance as appropriate based on site-specific considerations, or written consent of the affected abutter(s), if the project satisfies all other criteria for the granting of a special permit under the provisions of this section.

5.5 Required Supporting Documentation

The applicant shall provide the special permit granting authority with a description of the proposed project which shall include:

5.5.1 General

All plans and maps shall be prepared, stamped and signed by a professional engineer licensed to practice in Massachusetts. Included in the application shall be:

- (a) Name, address, phone number and signature of the applicant, as well as all co-applicants or property owners, if any.
- (b) The name, contact information and signature of any agents representing the applicant.
- (c) Documentation of the legal right to use the wind facility site, including the requirements set forth in 10.3.2(a) of this section

5.5.2 Technical Documentation

The applicant shall, at a minimum, submit the following technical documentation regarding the proposed wind energy facility to the special permit granting authority.

- (a) Wind energy facility technical specifications, including manufacturer and model, rotor diameter, tower height/type, foundation type/dimensions
- (b) Tower foundation blueprints or drawings signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts.
- (c) Tower blueprints or drawings signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts.
- (d) Electrical schematic

5.5.3 Location Map: Utility Scale Projects

The applicant shall submit, to the permit granting authority, a copy of a portion of the most recent USGS Quadrangle Map, at a scale of 1:25,000, showing the proposed facility site, including turbine sites, and the area within at least two miles from the facility. Zoning district designation for the subject parcel should be included; however a copy of a zoning map with the parcel identified is suitable.

5.5.4 Site Plan

A one inch equals 200 feet plan of the proposed wind facility site, with contour intervals of no more than 10 feet, showing the following:

- (a) Property lines for the site parcel and adjacent parcels within 300 feet.
- (b) Outline of all existing buildings, including purpose (e.g. residence, garage, etc.) on site parcel and all adjacent parcels within 500 feet. Include distances from the wind facility to each building shown.
- (c) Location of all roads, public and private on the site parcel and adjacent parcels within the setback distance of 1.2 times the blade tip height, and proposed roads or driveways, either temporary or permanent.
- (d) Existing areas of tree cover, including average height of trees, on the site parcel and adjacent parcels within the setback distance of 1.2 times the blade tip height.

- (e) Proposed location and design of wind facility, including all turbines, ground equipment, appurtenant structures, transmission infrastructure, access, fencing, exterior lighting, etc.
- (f) Location of viewpoints referenced below in 5.6.4 of this section.

5.5.5 Visualizations: Utility Scale Projects

The special permit granting authority may select up to four sight lines, including from the nearest building with a view of the wind facility, for pre- and post-construction view representations. Sites for the view representations shall be selected from populated areas or public ways within a 2-mile radius of the proposed wind energy facility. View representations shall have the following characteristics:

- (a) View representations shall be in color and shall include actual pre-construction photographs and accurate post-construction simulations of the height and breadth of the wind facility (e.g. superimpositions of the wind facility onto photographs of existing views).
- (b) All view representations will include existing, or proposed, buildings or tree coverage.
- (c) Include description of the technical procedures followed in producing the visualization (distances, angles, lens, etc.).

5.5.6 Visualizations: On-Site Projects

The special permit granting authority may select up to three sight lines, including from the nearest building with a view of the wind facility, for pre- and post-construction view representations. Sites for the view representations shall be selected from populated areas or public ways within a 2-mile radius of the proposed wind energy facility. View representations shall have the following characteristics:

- (a) View representations shall be in color and shall include actual pre-construction photographs and accurate post-construction simulations of the height and breadth of the wind facility (e.g. superimpositions of the wind facility onto photographs of existing views).
- (b) All view representations will include existing, or proposed, buildings or tree coverage.
- (c) Include description of the technical procedures followed in producing the visualization (distances, angles, lens, etc.).

5.5.7 Operation & Maintenance Plan

The applicant shall submit a plan for maintenance of access roads and storm water controls, as well as general procedures for operational maintenance of the wind facility.

5.5.8 Compliance Documents

The applicant will provide with the application:

- (a) description of financial surety that satisfies 5.2 of this section,
- (b) proof of liability insurance that satisfies Section 3.4 of this section,
- (c) certification of height approval from the FAA,

- (d) a statement that satisfies Section 3.8.4, listing existing and maximum projected sound levels from the wind energy facility.

5.5.9 Landscape Plan: (Utility Scale Projects Only)

A plan indicating all proposed changes to the landscape of the site, including temporary or permanent roads or driveways, grading, vegetation clearing and planting, exterior lighting, other than FAA lights, screening vegetation or structures. Lighting shall be designed to minimize glare on abutting properties and except as required by the FAA be directed downward with full cut-off fixtures to reduce light pollution.

5.6 Independent Consultants – (Utility-Scale Wind Facilities Only)

Upon submission of an application for a special permit, the special permit granting authority will be authorized to hire outside consultants, pursuant to section 53G of chapter 44 of the Massachusetts General Laws. As necessary, the applicant may be required to pay not more than 50% of the consultant's costs.

6.0 Building Integrated Wind Energy Facilities

Special permits shall be granted by the Permit Granting Authority for building integrated wind energy facilities that meet the criteria outlined in this section and in section 3 of this zoning provision.

6.1 Special Permit Granting Authority

No building integrated wind energy facility shall be erected, constructed, installed or modified as provided in this section without first obtaining a permit from the special permit granting authority. The construction of a building integrated wind energy facility shall be permitted subject to the issuance of a Special Permit and provided that the use complies with all requirements set forth in sections 3 and 6. All such wind energy facilities shall, where economically feasible, be constructed and operated in a manner that minimizes any adverse visual, safety, and environmental impacts.

6.2 Required Supporting Documentation for Building Integrated Wind Energy Facilities

The special permit application submitted to the Permit Granting Authority must, at a minimum, include:

- (a) Analysis and design documents, completed by a structural engineer registered to practice in the Commonwealth of Massachusetts, demonstrating that the proposed building is structurally sufficient to support the permanent installation of the proposed building integrated wind energy facility. At a minimum, the analysis should address vibration, wind load, and ice load.
- (b) Elevation drawings of building with building integrated wind energy facility installed, viewed from north, south, east, and west.
- (c) Building schematic detailing point(s) of connection and associated supports for the building integrated wind energy facility.

- (d) Schematic of attachment method for connecting the building integrated wind energy facility to the building.
- (e) Specification sheets for wind turbine and all related components (inverters, controllers, disconnects, etc.)
- (f) One or three line electrical diagram detailing wind turbine, associated components, and electrical interconnection methods, with all NEC compliant disconnects and overcurrent devices.